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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/418,441	10/15/1999	HARUHITO NAKAMURA	Q56262	8901

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EXAMINER
WERNER, BRIAN P

ART UNIT	PAPER NUMBER
2621	7

DATE MAILED: 09/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/418,441	NAKAMURA ET AL.	
	Examiner	Art Unit	
	Brian P. Werner	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) *13* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☒ Claim(s) *13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 February 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
(e) BACKGROUND OF THE INVENTION.
(1) Field of the Invention.
(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(f) BRIEF SUMMARY OF THE INVENTION.
(g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(h) DETAILED DESCRIPTION OF THE INVENTION.
(i) CLAIM OR CLAIMS (commencing on a separate sheet).
(j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

(k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

3. The disclosure is objected to because of the following informalities: The specification appears to be a direct translation of a Japanese patent publication, which is arranged in a manner that is inconsistent with customary U.S. practice. For example, the claims appear at the beginning of the specification, a summary of the invention is lacking, page numbers are lacking, the brief description of the drawings appears at the end of the specification, etc. The examiner requests that the specification be re-written to correspond with the U.S. practice. The abstract exceeds 250 words, and includes a listing of reference numerals. An abstract not to exceed 250 words, on a separate sheet, and not including the reference numeral listing is required. Specification page 16, line 5, "FIG. 25" should be figure 6A or 6B (i.e., there is no figure 25). Appropriate correction and conformity of U.S. practice is required.

Drawings

4. Figures 12-14 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). These figures are discussed in relation to the prior art at specification page 5. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid

abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

5. Claim 13 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim it depends from multiple dependent claim 8. See MPEP § 608.01(n). Accordingly, the claim 13 has not been further treated on the merits.

6. The following quotation of 37 CFR § 1.75(a) is the basis of objection:

> (a) The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

7. Claims 1-13 are objected to under 37 CFR § 1.75 as failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention or discovery.

Claim 1 recites, "points of the object can be detected at a speed...". The language "can be" does not constitute a positively recited limitation. Just because something "can be", does not mean that it "is". While applicant may have intended for this to be a positively recited limitation, it is currently claimed as an intended use statement. The examiner will assume that "points of the object **are** detected at a speed ..." for examination purposes. However, should applicant elect not to make this amendment, the examiner will treat this statement as intended use in subsequent Office Actions. The term "can be" is used in every claim, with respect to various limitations,

either directly or by dependency. Therefore, this objection applies to each of claims 1-13.

Claim 1 recites, "at which three-dimensional information can be followed real time within a period of time..." The term "can be" is vague for the reasons advanced above. In addition, the examiner is unsure what is meant by "can be followed real time". What is meant by "followed"? The following will be assumed for examination purposes: "at which three-dimensional information [can be followed] is generated in real time within a period of time..." This limitation appears in every claim either directly or by dependency. Therefore, this objection applies to each of claims 1-13.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

9. Claims 1 and 5-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Stern et al. (US 5,16,259 A).

Regarding claims 1 and 9 (these claims are equivalent method and apparatus claims respectively; therefore, the language of claim 9 will be used in this rejection), Stern discloses: a projection section (figure 1, numeral 10), an image pickup section (figure 1, numeral 20), and a signal processing section (figure 1, numeral 30) which calculates distance to an object (figure 1, numeral 31) based on intensity level information in a video signal from the pickup section (figure 1, numeral 24; "the elements of the latter array provide electrical signals which are a measure of the energy in different individual parts of the reflected optical signal S_T" at column 4, line 23; the detector array of Stern is equivalent to the detector as disclosed by applicant; applicant does not disclose any particular format of the video signal, other than that is comprises 2D image information and that is exactly what Stern discloses; i.e., "two dimensional spatial information (based on the detector array elements)" at column 4, line 35), wherein the gain is changed with time (figure 1, numeral 23), and the distance between the points of the object are detected at a speed at which the 3D information is generated in real time within a period corresponding to the frame of a video signal (as depicted in figures 6 and 7; the claim makes no requirements regarding a "frame"; thus, given that each measurement of distance in the Stern reference happens at t_T, and the image of reflected light is captured by the detector as shown by figure 7, then the process of generating 3D information happens in real time within a period of one frame).

Regarding claim 5, first and second optical images are formed of first and second illumination light ("first pulse" and "second pulse" at column 5, lines 51 and 54) which illuminates with a single intensity over a predetermined period of time (the pulses are of fixed amplitude, and fixed duration as depicted in figures 1 and 6-9), and the distance to points on the object is detected from the first and second images (the equation at column 5, line 65) which are produced with first and second gains ("first gain" and "second gain" at column 5, lines 52 and 55), either of which is changed with time ("linear, monotonic function" at column 5, line 58).

Regarding claim 6, the first gain is increased with time and the second gain is uniform (figures 2A and 2B respectively).

Regarding claim 7, the first gain is increased and the second gain is decreased with time (figures 3A and 3B respectively).

Regarding claim 8, the image is acquired a plurality of times within a period corresponding to the frame ("different signals ... both be developed by the single receiver" at column 5, line 47).

Regarding claims 10 and 11, the projection section has a light emitting element (figure 1, numeral 11) whose light is modulated in accordance with an electrical signal (figure 1, "synchronization").

Regarding claim 12, the image pickup section comprises an imaging means which produces an optical image (figure 1, numeral 21), an image pickup element which captures the optical image (figure 1, numeral 24), and an image intensifier with gating

operation and controllable gain between the two (figure 1, numeral 22; refer to figure 5 which better shows the gain and gating signals).

10. Claims 1-4, and 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Ogawa (US 5,694,203 A).

Regarding claims 1, 8 and 9 (these claims are equivalent method and apparatus claims respectively; therefore, the language of claim 9 will be used in this rejection), Ogawa discloses: a projection section (figure 1, numerals 1-4), an image pickup section (figure 1, numerals 5, 6), and a signal processing section (figure 1, numerals 9, 11) which calculates distance to an object ("whole distance image" at column 5, line 52) based on intensity level information in a video signal from the pickup section ("maximum value is stored in the frame memory" at column 5, line 35, wherein the intensity is changed with time (figure 2, "GTS"; the intensity is pulsed; Note: This limitation is also met by the embodiment in figure 8, where the illumination intensity is depicted at figure 9 as "SIN"), and the distance between the points of the object are detected at a speed at which the 3D information is generated in real time ("real time" at column 1, line 9 and column 4, line 19) within a period corresponding to the frame of a video signal ("five frame data ... per one cycle period T" at column 5, line 44; "throughout all the picture elements to produce the frame data ZBUF; thereby obtaining the whole distance image" at column 5, line 51).

Regarding claim 2, first and second optical images (figure 2, "GTS" refers to the captured images; any two of the five images meet the claimed requirement; However,

for purposes of this examination, the first image will be referred to as the image 3, which captures the "A" pulse and image 5, which captures the "B" pulse) illuminated by first and second illumination light (the "A" and "B" pulses as seen in figure 2) are formed, either of which includes time-varying intensity (both pulses increase and then decrease in intensity as depicted in figure 2), the images acquired by a single image pickup gain over a period of time (the gain does not changes, and the image is acquired over the period of time corresponding to the GTS pulse as depicted in figure 2), the distance between points on the object are detected based on the images in real time ("real time" at column 1, line 9 and column 4, line 19) within a period of a video frame ("five frame data ... per one cycle period T" at column 5, line 44; "throughout all the picture elements to produce the frame data ZBUF; thereby obtaining the whole distance image" at column 5, line 51).

Regarding claim 3, the first illumination intensity increases in time (illumination pulse A increases in time before reaching a peak value as depicted in figure 2; i.e., the transition from the off to the on state is not instantaneous, and the claim makes no requirements regarding the rate of change of the illumination) and the second has a given intensity (illumination pulse "B" has a given peak intensity value as depicted in figure 2; the claim does not preclude leading and trailing edges of the pulse).

Regarding claims 10 and 11, a modulator is disclosed (figure 1, numeral 2).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Haruhito (JP 06-294868 A – figures 1 and 2) and Scott (US 4,935,616 A – figure 1, and column 6, lines 10-35) are pertinent as disclosing the limitations of at least claims 1 and 9.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian P. Werner whose telephone number is 703-306-3037. The examiner can normally be reached on M-F, 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H. Boudreau can be reached on 703-305-4706. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4750.

Brian Werner
Patent Examiner
September 17, 2002

BRIAN WERNER
PATENT EXAMINER
ART UNIT 2621